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Effect of antiadrenergic therapy on the onset heart rate of microvolt level T wave alternans in patients prone to sudden cardiac death

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Background: Assessment of microvolt level T wave alternans (TWA) is a promising new tool for risk stratification. In patients (pts) prone to sudden cardiac death (SCD), betablocker (BB) administration is a mainstay of therapy. TWA assessment requires increase in heart rate. At present, it is not known whether antiadrenergic therapy affects the heart rate onset of TWA. Accordingly, onset heart rate (OHR) of TWA was evaluated using atrial pacing before and after administration of BB. Methods: In a prospective, double blind study, TWA was measured at baseline and after administration of metoprolol (0.1mg/kg iv over 5 minutes) and sotalol (1.0mg/kg iv over 5 minutes) using atrial pacing to increase heart rate. OHR was defined as the HR at which a sustained and significant TWA (amplitude >1.9 μV; alternans ratio >3) first occurred. Results: A total of 54 patients with a history of documented or suspected VT/VF (age 61+10 years; 70% coronary artery disease, LVEF 37+13%) were included in the study. In 48/54 patients (89%) TWA was positive at baseline. In 40 of these (83%) it remained positive after drug administration. Resting heart rate decreased significantly after administration of both drugs (metoprolol: 79+12 to 67+10 bpm; sotalol: 75+12 to 60+9 bpm; $p<0.01$). However, there was no significant change in onset HR before and after drug administration (metoprolol 94+8 vs 95+7 bpm;$p=0.86$; sotalol 99+10 vs 98+12 bpm; $p=0.83$). Eight patients turned negative on drug (5 on metoprolol, 3 on sotalol) due a decrease in TWA magnitude rather than a shift in onset HR. Conclusion: The results of this prospective study demonstrate that OHR of TWA is not significantly affected by antiadrenergic therapy. Therefore, risk assessment using TWA determination can be performed while maintaining the pharmacological regimen under which the risk of arrhythmia is being assessed.